

NEEDS NO LIGHT FOR PHOTOGRAPHS

Professor Oswald takes Discovery of Scientific and Commercial Value.

SILVER AS A CATALYSER

Reduces Time of Operation and Permits Almost Unlimited Reproduction.

NITRIC ACID BY NEW METHOD

All Germany, with its Large Demand for Nitrates, Interested in This Novel Achievement.

Scientists throughout this country are much interested in two important discoveries which were recently made by Professor Dr. Wilhelm Oswald, a German chemist. One of these relates to photography, and its crowning merit lies in the fact that by means of a new process Professor Oswald is able to print pictures from negatives without any light, and the other relates to a new method of producing nitric acid from ammonia.

Professor Oswald, who is now in this country, having been invited to deliver the inaugural address at the State University of California on the occasion of the opening of the new biological laboratory, was born at Riga, of German parents, in 1854, and remained in that city until 1872, when he entered the University of Dorpat. In 1878 he obtained his doctor's degree, and for the next three years he lectured at the university, mainly on chemistry and other scientific subjects. In 1881 he was appointed professor of chemistry at the Polytechnical School in Riga, and six years later, a similar position having been offered, he removed to the University of Leipzig, and there he has remained ever since.

His principal lectures for some years have been on physics and chemistry, and among his pupils have been several distinguished Americans, including Professor T. W. Richards, of Harvard; Professor Morgan, of Columbia, and Professor Bauroft, of Cornell.

One of his present pupils is Dr. George W. Helmrod, of Omaha, Neb., and from him some interesting details in regard to the new discoveries were obtained. "The ordinary methods of printing photographs," he said, "are more or less expensive, the main reason being because they are based on the supposition that light must pass through the negative before the required chemical changes can take place in the sensitized paper."

"Professor Oswald, on the other hand, produces the same result by means of the so-called catalytic reaction. This is apparently due to the presence of substances known as catalysers, but these substances merely increase the speed with which the reaction takes place. For example, hydrogen and oxygen can exist together and apparently do not react on each other at all under ordinary conditions, but as soon as certain substances, for instance, fine platinum or finely divided silver, come in contact with the mixture a chemical union will take place which may go on so fast that the whole mass will explode. In this case the platinum or silver has acted as the catalyst. Simply by its presence it promotes the chemical reaction."

"Professor Oswald makes use of this principle in photography by treating an ordinary silver negative with a solution of hydrogen peroxide. The latter has a tendency to break up into gaseous oxygen and water, but under normal conditions a solution of this kind goes on very slowly. In the presence of silver, however, it goes on very quickly, and exactly in proportion to the amount of silver present. On the negative, therefore, will be found after a short time a certain quantity of hydrogen peroxide, but only in those places where there is no silver. Where silver is the reaction will take place. After this all that is necessary is to transfer this invisible picture to an ordinary piece of gelatin paper, for then, after a contact of thirty seconds, it can be developed in several ways, as, for example, by transferring it to a solution of iron sulphate."

"The result in this case will be an oxidation of the iron sulphate on all those places where the hydrogen peroxide has been transferred. If after a short washing a solution of gallic acid is now applied the result will be a genuine ink picture. This process has many advantages over those now in use. First, no light of any kind is needed, for a picture can be printed just as well in darkness as in daylight; second, the papers and chemicals are much cheaper; third, the process is so simple that it can be carried out by anyone; fourth, the result is so good that it can be compared with the best of the ordinary sensitive papers, which are good for only a brief period, sometimes only for two or three days; fifth, with the very cheapest materials a variety of colors can be obtained, for there is no limit in this respect, almost the entire range of chemical substances being at our disposal; fourth, this method is much cheaper than any other, and, fifth, being wholly mechanical it enables one to print large editions in a very short time."

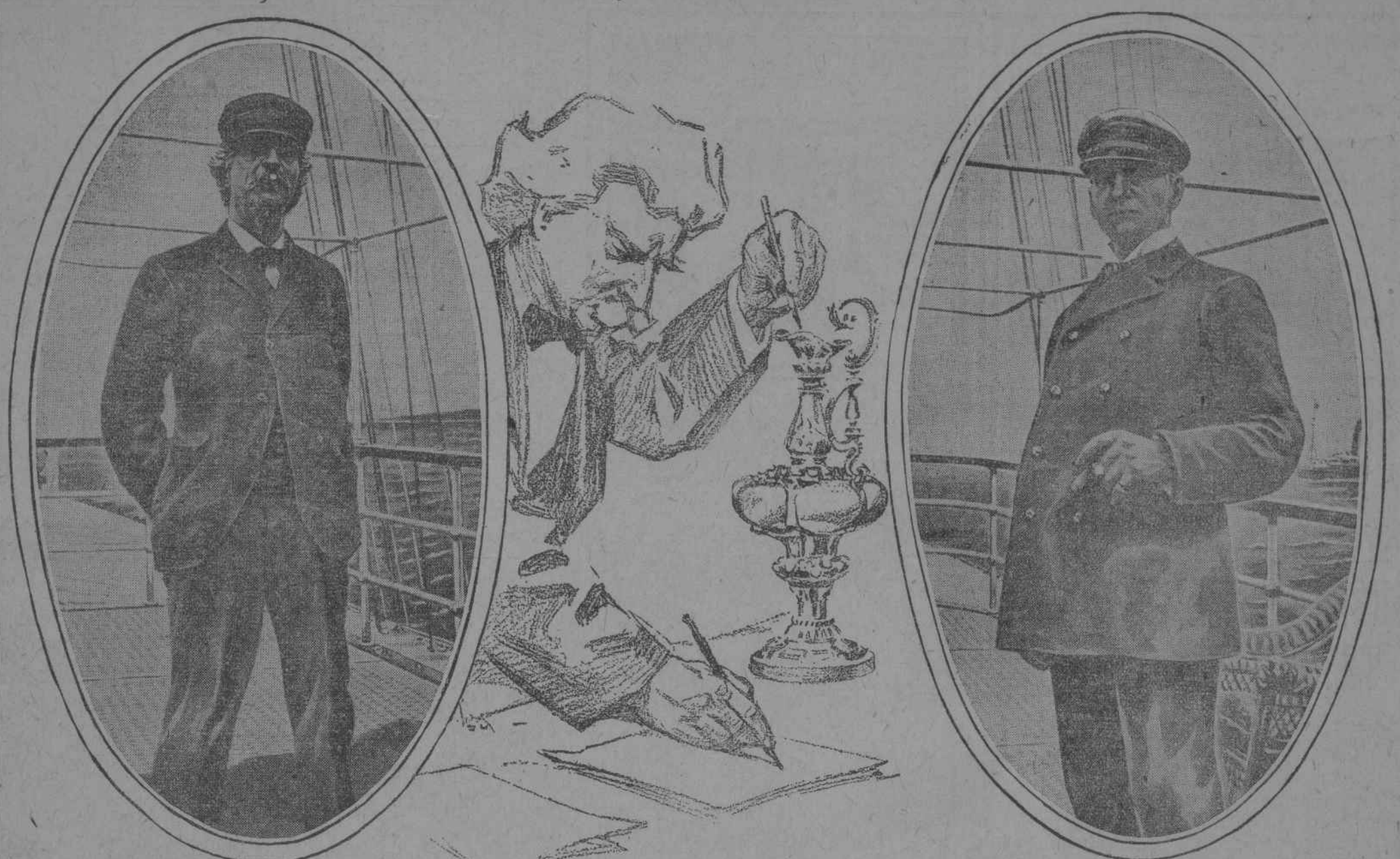
"Any design or drawing can be quickly copied by this process, and how important this is to draughtsmen as well as publishers is understood. Finally it should be remembered that the silver used in the process does not take any part in the reaction, and therefore can be used for any number of prints."

Dr. Helmrod also spoke in glowing terms of Professor Oswald's novel method of producing nitric acid from ammonia. "This is also a catalytic process," he said, "and is cheap. Professor Oswald allows air to go through the ammonia, and this mixture of ammonia and air is then passed over heated platinum, the result being that the oxygen of the air oxidizes the ammonia to nitric acid. Nitric acid can be produced in this way much cheaper than it can be obtained at present. To Germany a discovery of this kind is naturally of vast importance, for it is an agricultural country and uses much artificial manure rich in nitrates. Yet, for its nitric it has hitherto been dependent on Chile, and has been obliged to pay a pretty stiff price for all that it imports."

"Every civilized country, however, should be almost, if not quite, as much interested in this discovery as Germany, and for the reason that it is likely to play a prominent part in the future manufacture of gunpowder, dynamite and other explosives. Under ordinary circumstances Germany, in case of war, would have to obtain the necessary supply of nitre from Chile, but now, thanks to Professor Oswald, she can obtain as much nitric acid as she wants and at a nominal cost, for ammonia is very cheap, and nothing else is required except air. The same holds true to an almost equal extent of other countries, for Chile may be said to have a monopoly of commercial nitre."

"Although he is rightly regarded in Germany, and indeed, by all scientists, as a chemist of the highest rank, Professor Oswald has also distinguished himself in other directions. Thus he is an excellent pianist, a good musician and an author of wide repute. As a proof of the high esteem in which he is held throughout Europe and America it is worthy of note that ever since he began to lecture in Leipzig more than twenty-five per cent of his pupils have been Americans. Thus he has at present forty pupils, of whom twenty-three are foreigners, and of the latter seven are natives of this country."

Mark Twain, Able Yachtsman, on Why Lipton Failed to Lift the Cup



MARK TWAIN ON THE BRIDGE.

CLANCY ON THE BRIDGE.

Just a Case of British Easygoing Carelessness, a Waterbury Anchor Watch Without the Anchor, and That Sort of Thing.

THE SHAMROCK BROKE SPINNAKER, TOO

"AREN'T you charging rather high rates for this interview?"

"Not any higher than I always charge when I am present in person during the interview."

"Yes; in those cases I do not know I have been interviewed until I see it in the papers."

"Do you enjoy that?"

"Well, no; I think it is not quite fair. It is my trade to talk and write; it is my bread and butter. A man cannot honorably take it from my family without consent. What is it we are to talk about now?"

"The yacht races. The *HERALD* would like you to explain the reasons of the results."

"Why—that is all right, but I doubt if I can earn the money."

"Why?"

"Well, because I can only state the facts. I can't intelligently philosophize them, analyze them, deduce results from them—and all that wise kind of thing, you know. Do you care for facts—just mere cold, unemotional facts?"

"Dear sir, we prefer them to anything else."

SLAVE OF TRUTH.

"Allow me. Give me your hand! We meet upon holy ground. I have no longer any tremblings at the heart, no longer any disturbing anxieties. Facts are my passion. I!"

"You have been called the slave of truth."

"Have you heard it? You make me proud, happy; you sing all my solicitudes to rest. Proceed."

"You have seen all of the races?"

"Yes, all of them."

"On board the *Kanawha*?"

"Yes."

"She is the fastest steam yacht afloat, I believe."

"Yes, she has beaten all the flyers. When I am feeling good I can make thirty-seven knots an hour with her. . . . Why do you look at me like that?"

"I beg pardon. I assure you I didn't mean to. How?"

"Well, you mustn't look at me like that. I am very sensitive."

"It was an oversight. I give you my word. I would not wound you for anything. My hearing is not good, and I did not quite catch the number of knots, I think. How many did you say it was?"

"Forty-five. She's a bird—just a bird. She!"

PATRICK CLANCY'S FIGURES.

"Do you take her gait yourself?"

"No, it is done by one of the men—Patrick Clancy. He is in the forecastle. She has made as high as forty-nine. He told me so himself."

"Is he—is he trustworthy?"

"Who—Clancy? I should think so! I wouldn't trust a statement of my own sooner."

"Neither would I."

"Let me take you by the hand. Is Clancy trustworthy? Why, it would make everybody in the ship smile to hear you say that, Patrick Clancy!"

"Is he experienced? Is he calm, unexcitable; does he know the boat well?"

"Knows her like a book! Knows every inch of her hundred and twenty-seven feet; knows every ton of her four hundred; can tell by the flutter of her screw when she's making her Sabbath-day 290 revolutions and when she's on the war-path and turning out four thousand a minute. Does Patrick Clancy know the *Kanawha*? Why, man, he's been in her ever since she was a little thing not thirty feet long and couldn't make ten miles an hour; he told me so himself."

"Do you own the *Kanawha*?"

"Well, no, I don't exactly own her. I only help to run her. Mr. Rogers owns her."

"Do you command her?"

"Well, no, not exactly that. I only superintend."

"By request?"

"Well, I wouldn't put it quite as strong as that; but I do a good deal of work, you know; in fact, the important part of it. Superintending is more important than commanding, and more worrying and fatiguing, you know, because you have to be everywhere and attend to everything. Superintending is much the most exacting function on board a ship, and requires more varied talent and alertness, and more patience and calmness under explosions of resentment and insubordination than any other in the service. There are but few really good superintendents."

"The salary must be very large?"

"No, there isn't any salary; all a person gets is neglect and ingratitude. If a superintending conscientiously does his whole duty, there's never anything going on but mutiny and insurrection. If I have ever had an order obeyed without being requested to mind my own business, I have no recollection of it. It is just a dog's life, and that is the best you can say about it."

"Why don't you resign?"

"Resign? How can I resign when I haven't been appointed? If I could get appointed I would resign in a minute."

"Is there no way to?"

"To what? No, there isn't. When you are a superintending, there you are, and you can't help yourself. Sometimes I wish I was dead."

"It does seem to be a sorrowful vocation."

SORROWFUL VOCATION.

"Funerals is hilarity compared to it. Daily and hourly your feelings are hurt. Hurt by disobedience; yes, and almost always accompanied by remarks which, why, let me give you an instance. You remember that first day when we were racing with those steamboats, the *Cor-sair* and the *Revolution* and the *Havoli* and Mr. Leeds' *Clipper* and hanging their sculps up there on the mizenforetopgallant halysards to dry, one by one? I found the second mate off his base and ordered him into irons as a lesson, and he told me to go to—never mind where he told me to go, but how would you like to be treated like that, and you doing the best you could?"

"Ah, that gives me an idea. It would be just like such a man as that to keep crossing the *Monmouth's* bow the way the *Kanawha* did Saturday in the race home. It was scandalous. Was he steering?"

"It's getting late, let's talk about something else. I was at the wheel myself. Are you intertemperate? Would you like something? So would I. Push the button. What were you saying about—about—"

"I wasn't saying anything about anything, but now that I think of it, what was the reason that the *Shamrock* performed so indifferently in the first race—that one that was a failure?"

"Well, I know the reason, for I got it from Clancy at the time. It is pretty technical, but, barring that, it is easy to understand. It was a case of British easygoing carelessness on the part of the *Shamrock* plant—good enough sailors, you know, but heedless, oh, beyond imagination! Not just one case of it, but two or three—Clancy explained the whole thing to me. In the first place, when they came to set the anchor watch it was a Waterbury, and they lost two minutes in the winding, and that took off the whole time allowance and three seconds besides—ought to have been wound up before, of course."

"And then, when they got it set, there they were again—an anchor watch, all right enough, but they found they hadn't any anchor. It had been left at the Waterbury, by some oversight, and they had to throw overboard to make up for it. Also, they had to remeasure the boat, and that shortened her by an inch. I do not know why, but Clancy does. An inch is not much, but if you take it off the front end, that end does not arrive at the home-stake as early as it would if it were an inch longer, and, of course, as you can see yourself, even that little could lose a race. It didn't in this case, because there was a lot more inches that did not arrive in time, but the principle is sound; you can see it yourself."

"Yes, it looks so. But they lost the second race, too—the first real race. How does Clancy account for that?"

"Difference in seamanship, he says. That and other things. Accidents and one thing and another."

"THE SHAMROCK'S ACCIDENTS."

"Did the *Shamrock* have accidents?"

"She had one that lost her the race."

"What was that?"

"The *Shamrock* broke her spinnaker, too."

"Why did she break her spinnaker?"

"She broke it because she was so careless. She didn't know what she was doing. She was so careless that she broke it."

"What was the result of that?"

"The result was that she lost the race. She was so careless that she broke it, and she lost the race."

"What was the reason for that?"

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